

1. A louvered fin for,

- 1 1. A louvered fin for a heat exchanger, comprising:
2 a first corrugated strip having planar and connecting
3 portions that are alternately arranged to make a corrugation,
4 said first corrugated strip extending straight in a longitudinal
5 direction;
6 a plurality of first louvers formed in each planar portion
7 such that said first louvers are arranged in a lateral direction
8 perpendicular to said longitudinal direction, said first louvers
9 in each planar portion being configured to be in asymmetry in
10 said lateral direction;
11 a straightening member for keeping said first
12 corrugated strip in a straight shape in said longitudinal
13 direction, said straightening member extending along a
14 longitudinal side of said first corrugated strip; and
15 a first bridge member for attaching said first corrugated
16 strip and said straightening member together such that a
17 detachment of said straightening member from said first
18 corrugated strip is allowed by breaking said first bridge
19 member after said first corrugated strip is fixed between first
20 and second adjacent tubes of said heat exchanger in a
21 production of said heat exchanger.
- 1 2. A louvered fin according to claim 1, wherein said first
2 louvers are orientated in a first uniform direction.
- 1 3. A louvered fin according to claim 2, wherein said
2 straightening member comprises:
3 a second corrugated strip extending along said
4 longitudinal direction of said first corrugated strip and having
5 planar and connecting portions that are alternately arranged to
6 make a corrugation; and

7 a plurality of second louvers formed in each planar
8 portion of said second corrugated strip such that said second
9 louvers are arranged in said lateral direction and are
10 orientated in a second uniform direction that is opposite to the
11 first uniform direction of said first louvers.

1 4. A louvered fin according to claim 3, further comprising
2 a second bridge member for attaching said first and second
3 corrugated strips together, said first and second bridge
4 members being formed at an interval in said longitudinal
5 direction with an interposal of a slit between said first and
6 second bridge members.

1 5. A louvered fin according to claim 4, wherein each of said
2 first and second bridge members is disposed in said lateral
3 direction between said connecting portion of said first
4 corrugated strip and said connecting portion of said second
5 corrugated strip.

1 6. A louvered fin according to claim 3, wherein each
2 connecting portion of said first and second corrugated strips
3 has a planar shape and is prepared by straightening a
4 V-shaped portion of a blank of said first and second corrugated
5 strips into said planar shape.

1 7. A heat exchanger comprising a first assembly, said first
2 assembly including:

3 first and second tanks;

4 first and second tubes extending between said first and
5 second tanks such that a heat-exchanger medium is allowed to
6 flow from said first tank to said second tank;

7 a first corrugated strip fixed between said first and
8 second tubes, said first corrugated strip having planar and

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9 connecting portions that are alternately arranged to make a
10 corrugation, said first corrugated strip extending straight in a
11 longitudinal direction and having a fracture surface at a
12 longitudinal side of said first corrugated strip; and

13 a plurality of first louvers formed in each planar portion
14 such that said first louvers are arranged in a lateral direction
15 perpendicular to said longitudinal direction and such that said
16 first louvers in each planar portion is configured to be in
17 asymmetry in said lateral direction;

18 wherein said heat exchanger is produced by a method
19 comprising the steps of:

20 (1) providing a louvered fin comprising (a) said first
21 corrugated strip; (b) said first louvers; (c) a straightening
22 member for keeping said first corrugated strip in a straight
23 shape in said longitudinal direction, said straightening member
24 extending along a longitudinal side of said first corrugated
25 strip; and (d) a first bridge member for attaching said first
26 corrugated strip and said straightening member together;

27 (2) fixing said first corrugated strip between said first
28 and second tubes such that said first corrugated strip is kept in
29 said straight shape by said first and second tubes; and

30 (3) detaching said straightening member from said first
31 corrugated strip by breaking said first bridge member such
32 that there is provided a sandwiched structure having said first
33 corrugated strip fixed between said first and second tubes and
34 such that said fracture surface of said first corrugated strip is
35 exposed.

1 8. A heat exchanger according to claim 7, wherein said
2 straightening member used in said method comprises:

3 a second corrugated strip extending along said
4 longitudinal side of said first corrugated strip and having

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5 planar and connecting portions that are alternately arranged to
6 make a corrugation; and
7 a plurality of second louvers formed in each planar
8 portion of said second corrugated strip such that said second
9 louvers are arranged in said lateral direction and are
10 symmetrical to said first louvers about said first bridge
11 member.

1 9. A heat exchanger according to claim 8, further
2 comprising a second assembly, said second assembly including:
3 third and fourth tanks;
4 third and fourth tubes extending between said third and
5 fourth tanks such that a heat-exchanger medium is allowed to
6 flow from said third tank to said fourth tank;

7 said second corrugated strip fixed between said third
8 and fourth tubes and having a fracture surface at a
9 longitudinal side of said second corrugated strip; and
10 said second louvers formed in each planar portion of
11 said second corrugated strip;

12 wherein said method further comprises, prior to the
13 step (3), the step of fixing said second corrugated strip between
14 said third and fourth tubes such that said second corrugated
15 strip is kept in a straight shape by said third and fourth tubes,
16 and

17 wherein the step (3) of said method is conducted such
18 that there is provided a sandwiched structure having said
19 second corrugated strip fixed between said third and fourth
20 tubes and such that said fracture surface of said second
21 corrugated strip is exposed.

1 10. A heat exchanger according to claim 8, wherein said
2 first and second louvers are respectively orientated in a first
3 uniform direction and a second uniform direction.

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1 11. A method for producing a heat exchanger, said method
2 comprising the steps of:

3 (1) providing a louvered fin, said louvered fin
4 comprising:

5 (a) a first corrugated strip having planar and connecting
6 portions that are alternately arranged to make a corrugation,
7 said first corrugated strip extending straight in a longitudinal
8 direction;

9 (b) a plurality of first louvers formed in each planar
10 portion such that said first louvers are arranged in a lateral
11 direction perpendicular to said longitudinal direction, said first
12 louvers in each planar portion being configured to be in
13 asymmetry in said lateral direction;

14 (c) a straightening member for keeping said first
15 corrugated strip in a straight shape in said longitudinal
16 direction, said straightening member extending along a
17 longitudinal side of said first corrugated strip; and

18 (d) a first bridge member for attaching said first
19 corrugated strip and said straightening member together,

20 (2) fixing said first corrugated strip between first and
21 second adjacent tubes of said heat exchanger such that said
22 first corrugated strip is kept in said straight shape by said first
23 and second tubes; and

24 (3) detaching said straightening member from said first
25 corrugated strip by breaking said first bridge member such
26 that there is provided a first sandwiched structure having said
27 first corrugated strip fixed between said first and second tubes.

1 12. A method according to claim 11, wherein said louvered
2 fin is prepared by a method comprising the steps of:

3 (4) providing a first blank of said first corrugated strip
4 with said straightening member and said first bridge member

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5 such that said straightening member extends along a
6 longitudinal side of said first blank and is attached to said first
7 blank through said first bridge member;

8 (5) forming said first louvers in said first blank;

9 (6) shaping said first blank into a first corrugated
10 blank; and

11 (7) cutting each of said first corrugated blank and said
12 straightening member to have a length in said longitudinal
13 direction, thereby preparing said louvered fin.

1 13. A method according to claim 12, wherein, in the step (5),
2 said first louvers are orientated in a first uniform direction.

1 14. A method according to claim 11, wherein said
2 straightening member comprises:

3 a second corrugated strip extending along said
4 longitudinal side of said first corrugated strip and having
5 planar and connecting portions that are alternately arranged to
6 make a corrugation; and

7 a plurality of second louvers formed in each planar
8 portion of said second corrugated strip such that said second
9 louvers are arranged in said lateral direction and are
10 symmetrical to said first louvers about said first bridge
11 member.

1 15. A method according to claim 14, wherein said louvered
2 fin is prepared by a method comprising the steps of:

3 (4) providing a first blank of said first corrugated strip
4 with a second blank of said second corrugated strip and the
5 first bridge member such that said second blank extends along
6 a longitudinal side of said first blank and is attached to said
7 first blank through said first bridge member;

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8 (5) forming said first and second louvers respectively in
9 said first and second blanks;

10 (6) shaping said first and second blanks respectively
11 into first and second corrugated blanks; and

12 (7) cutting each of said first and second corrugated
13 blanks to have a length in said longitudinal direction, thereby
14 preparing said louvered fin.

1 16. A method according to claim 15, wherein the step (4) is
2 conducted by perforating a blank of said louvered fin at regular
3 intervals in a longitudinal direction of said blank such that
4 said first and second blanks are formed and such that said first
5 bridge member is provided between adjacent first and second
6 perforations formed by said perforating.

1 17. A method according to claim 16, wherein the step (6) is
2 conducted by bending said first and second blanks at a position
3 of said first bridge member in said lateral direction.

1 18. A method according to claim 15, wherein each
2 connecting portion of said first and second corrugated strips is
3 prepared by straightening a V-shaped portion of each of said
4 first and second blanks into a planar shape.

1 19. A method according to claim 11, wherein the step (3) is
2 conducted by applying a vibration to said louvered fin to break
3 said first bridge member.

1 20. A method according to claim 11, wherein the step (3) is
2 conducted by rotating said first sandwiched structure and said
3 straightening member relative to each other to break said first
4 bridge member.

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1 21. A method according to claim 15, further comprising the
2 sequential steps of:

3 (8) fixing said second corrugated strip between third
4 and fourth tubes to prepare a second sandwiched structure;

5 (9) rotating said first sandwiched structure, which has
6 said first corrugated strip fixed between said first and second
7 tubes, and said second sandwiched structure relative to each
8 other by about 90 degrees;

9 (10) attaching first and second tanks to said first and
10 second tubes; and

11 (11) attaching third and fourth tanks to said third and
12 fourth tubes.

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